Miami-Dade County

Lean Six Sigma (LSS)

Yellow Belt Training

MIAMI-DADE COUNTY

Yellow Belt Training Agenda

8:30 am   - Introductions/ Kick-off / Training Objectives
                   - Yellow Belt and Lean Six Sigma Overview
                   - DMAIC Problem Solving Process
                   - Tools: Line graphs and spreadsheet

10:15   Break
10:30   - Technique: Flowchart
                   - Tool: Histogram
                   - Tool: Pareto (exercises)

Noon   Lunch
1:15 pm   - Tools: Single Case Bore and Fishbone
                   - Technique: Brainstorming
                   - Technique: Countermeasures (exercise)

2:30 pm   Break
2:45 pm   - Case Study (Green Belt Team)
                   - Lessons Learned/Certificates/Survey
4 pm   - Adjourn

MIAMI-DADE COUNTY

Yellow Belt Training Objectives

1. To understand Lean Six Sigma (LSS) principles, components and "Belt" expertise levels for staff.

2. To understand how Lean Six Sigma (LSS) will be used to facilitate operational improvements.

3. To understand key Lean Six Sigma (LSS) analytical tools and techniques used in performance improvement

4. To review a Green Belt Improvement Team's project addressing a significant problem

MIAMI-DADE COUNTY

Mission and Vision Statements

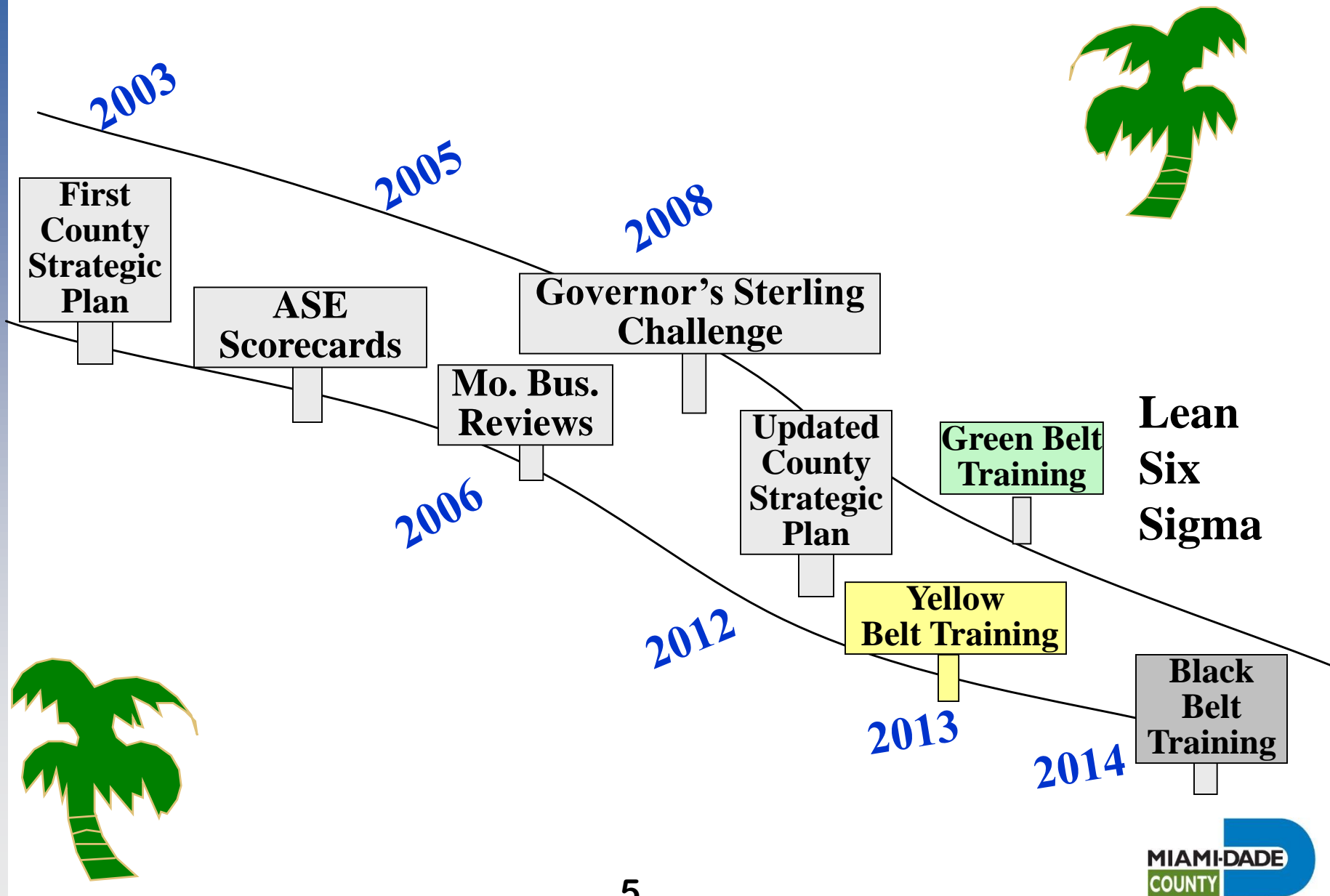**Miami-Dade County Mission Statement**

Delivering excellent public services that address our communities needs and enhance our quality of life

Miami-Dade County Vision Statement
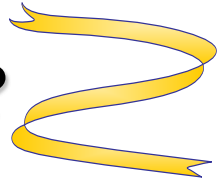
Delivering Excellence Every Day

Your Departmental Mission and Vision Statements……

History of Performance Excellence

2003

2005

2008

2006

2012

2013

2014

First County Strategic Plan

ASE Scorecards

Mo. Bus. Reviews

Governor's Sterling Challenge

Updated County Strategic Plan

Green Belt Training

Yellow Belt Training

Black Belt Training

Lean Six Sigma

MIAMI-DADE COUNTY

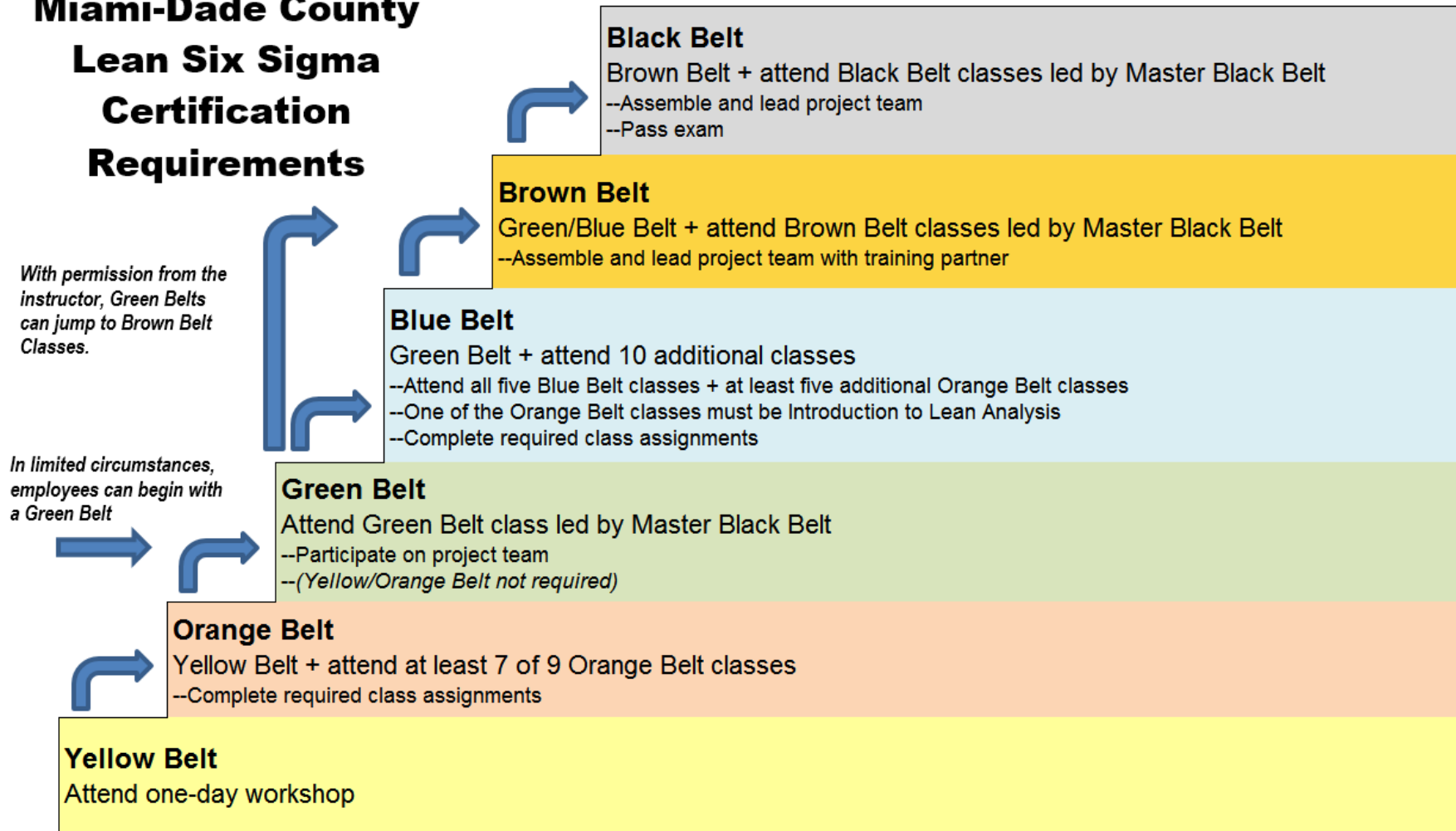## What is Lean Six Sigma Yellow Belt Training?

It is the ***initial statistical and analytical tools training*** needed by employees to successfully apply Lean Six Sigma methodology within an organization to continuously improve operations.

Why are we holding this training?

Demonstrated by several **Green Belt** Project Teams, Lean Six Sigma offers employees the next level of skills to help us become more effective and efficient in delivering our services to our customers in times of fiscal constraint.

MIAMI-DADE COUNTY

Lean Six Sigma Belt Levels

Miami-Dade County Lean Six Sigma Certification Requirements

Black Belt
Brown Belt + attend Black Belt classes led by Master Black Belt
--Assemble and lead project team
--Pass exam

Brown Belt
Green/Blue Belt + attend Brown Belt classes led by Master Black Belt
--Assemble and lead project team with training partner

Blue Belt
Green Belt + attend 10 additional classes
--Attend all five Blue Belt classes + at least five additional Orange Belt classes
--One of the Orange Belt classes must be Introduction to Lean Analysis
--Complete required class assignments

Green Belt
Attend Green Belt class led by Master Black Belt
--Participate on project team
--(Yellow/Orange Belt not required)

Orange Belt
Yellow Belt + attend at least 7 of 9 Orange Belt classes
--Complete required class assignments

Yellow Belt
Attend one-day workshop

With permission from the instructor, Green Belts can jump to Brown Belt Classes.

In limited circumstances, employees can begin with a Green Belt

MIAMI-DADE COUNTY

Lean Six Sigma (LSS) Training Plan

Miami-Dade County initiated Lean Six Sigma training in July 2012.

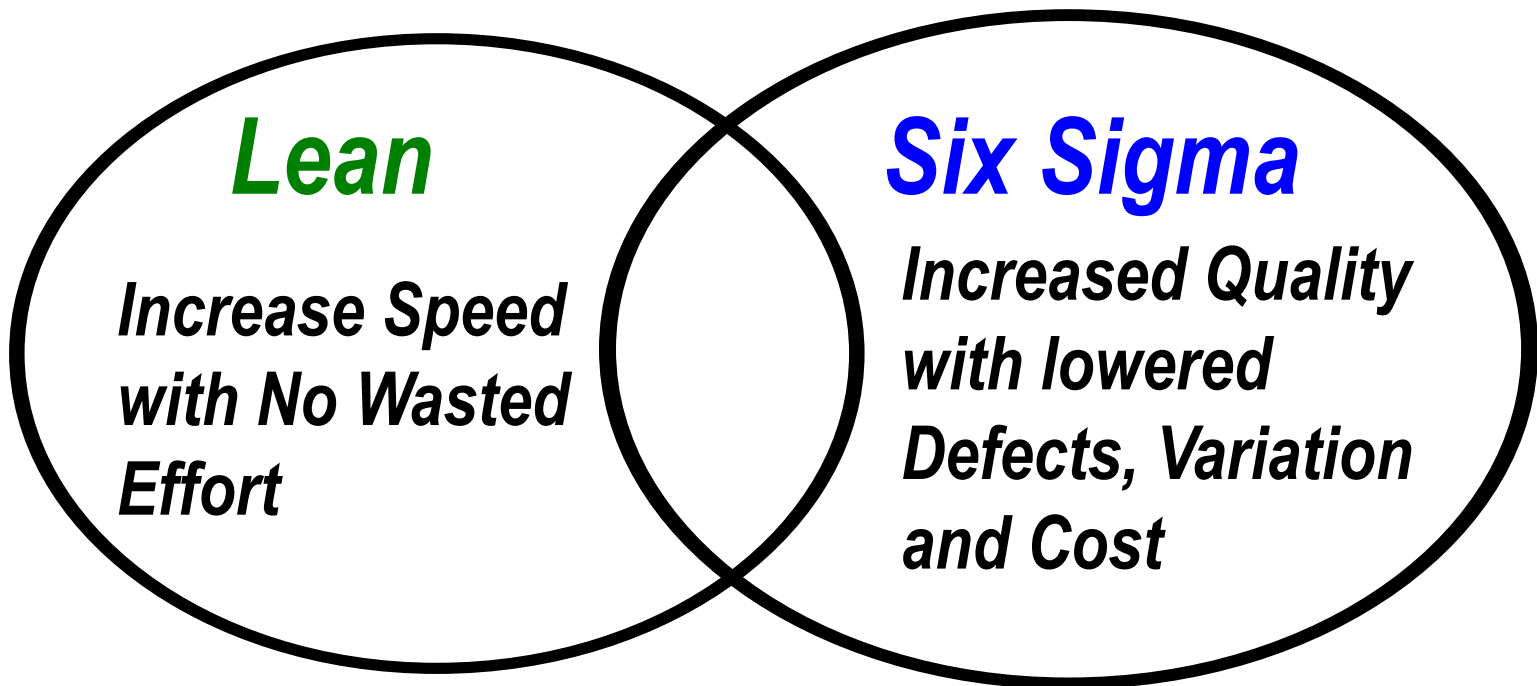| Phase | 2012 | | | | | | 2013 | | | | | | | | | | | | 2014 | | | | | | | | | | | | 2015 | | | | | | | | | | | | 2016 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| **Green Belt Classes** Each "Wave" is a class of 21 employees assigned to three teams. | | Wave 1 | | | | | Wave 2 | | Wave 3 | | Wave 4 | | | | | Wave 5 | | | | | | | | | | | | | Wave 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Yellow Belt Classes** --One-day workshop | | | | | | | ONGOING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Green Belt Team Leader** --12 employees working on six projects | | | | | | | | | Green Belt Team Leader | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Black Belt** --Six employees working on six separate projects | | | | | | | | | | Black Belt Training | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Orange and Blue Belt** --Multiple Modules | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Lean Six Sigma Overview

Why do we need Lean Six Sigma?

Lean Six Sigma is a proven methodology that will help us improve our work in order to consistently ensure…

- Our products and services meet (or exceed) customers' needs

- Our processes are cost-effective

- Employees are well-trained and motivated

- Government regulations are met

MIAMI-DADE
COUNTY

Lean primarily focuses on *Increasing Outputs*, for example, increasing process Speed while eliminating unnecessary Inventory and Waste.

Lean

Increase Speed with No Wasted Effort

Six Sigma

Increased Quality with lowered Defects, Variation and Cost

Six Sigma primarily focuses on *Improving Outcomes*, for example, eliminating Defects (DMAIC) and reducing unwanted Variation (Process Management)

10

MIAMI-DADE COUNTY

Lean: Seven + 1 Process Wastes

1. **Handling Too Much** (eg. multiple reviews, providing quicker service than customer needs, etc.)

2. **Over Production** (created by doing more than requested, sending unnecessary "Reply to All" emails, making more copies than needed, etc.)

3. **Wait (or Idle) Time** (for information, equipment to be repaired or serviced, permission to take action, etc.)

4. **Rework, Scrap, or Defects** (includes revisions, errors in output changes due to missing customer requirements, etc.)

5. **Unnecessary Processing** (doing more than needed, inspections, routing documents for approvals, etc.)

6. **Inventory (Work in Progress)** (e.g. batched orders, orders in queue, additional outputs to cover defects, purchases for future use, etc.)

7. **Motion** (created by poor work station set-ups, poor signage, not standardizing work tasks, etc.)

- **Plus 1:** Not Engaging Staff (Purchasing tools/equipment without employee input, changing operations without input, etc.)

MIAMI-DADE COUNTY

What is Sigma?

Sigma …is a Greek letter that represents a measure of process output variation (also known as standard deviation)
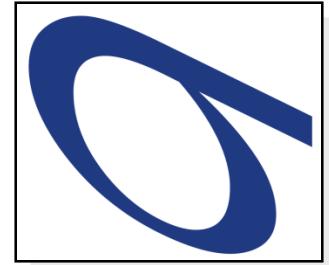
Sigma Level …Is a measure of performance. It measures how much of the process output falls within the customers' requirements. The higher the sigma level, the more of the process outputs meet customers' requirements (i.e. fewer defects in process outputs).
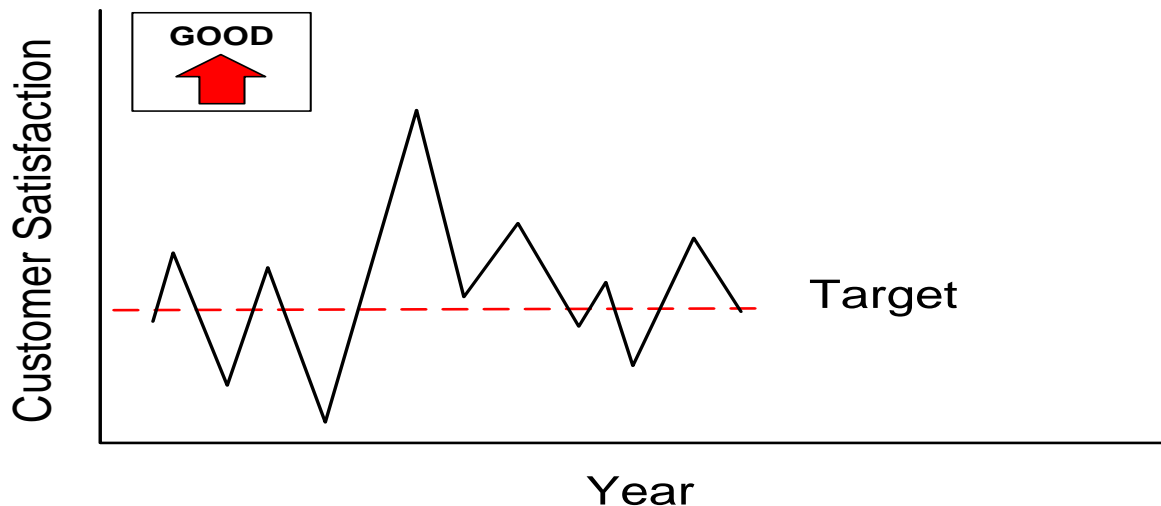
Six Sigma Level … refers to near perfection representing only 3.4 process output defects per 1 million opportunities.

What is Lean Six Sigma?

It provides **Customer Satisfaction** through the total involvement of **ALL** employees…

Or put in a graphic way…

…It makes **Line Graphs** move in the direction you want them to go.

Line graphs help us understand our performance

13

We know we're Successful when…

Example

- Our **Customers** tell us that they are satisfied with our services.

- Our **Costs** for doing business are the lowest possible.

% of Customer Satisfaction

GOOD ↑

Target= 85%

85%   78%   83%   64%

% Satisfaction

Q1   Q2   Q3   Q4

Cost Per Client Served

GOOD ↓

Target = 5.0

3.31   3.26   3.29   3.34

Cost Per Month

Oct   Nov   Dec   Jan

MIAMI·DADE COUNTY

14

Lean Six Sigma Overview
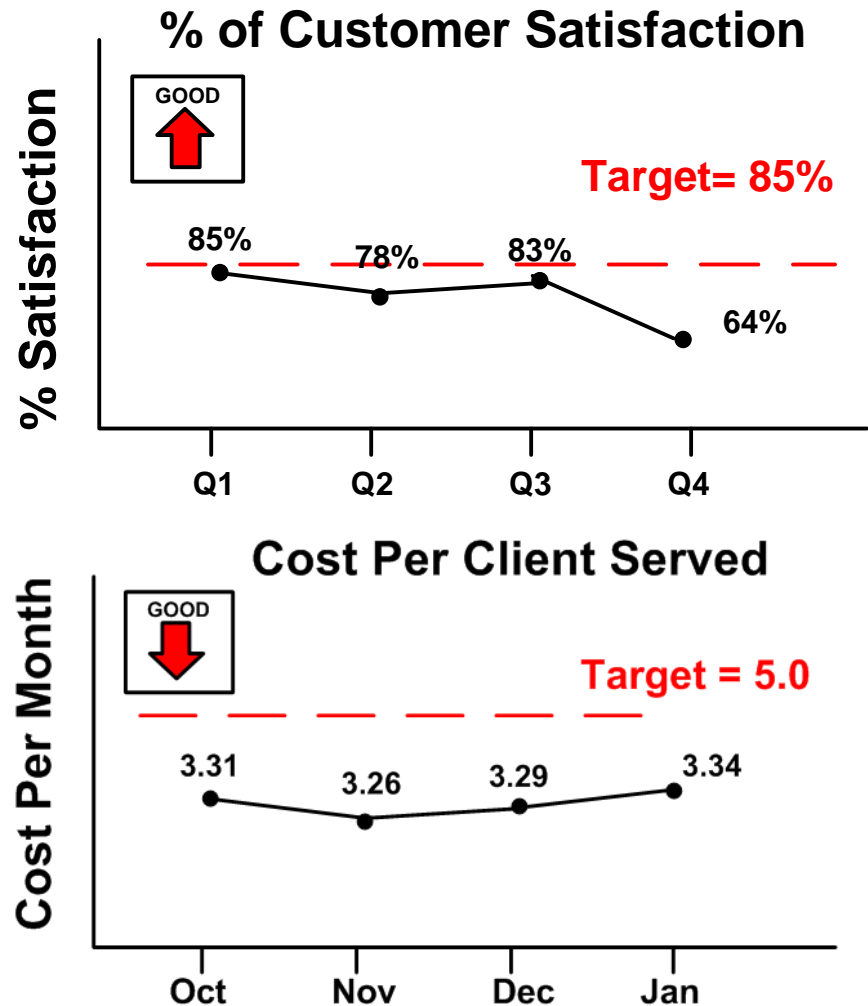
We know we're Successful when…

Example

- Our **Employees** are Satisfied.

- Our **Services** are Delivered On-Time.
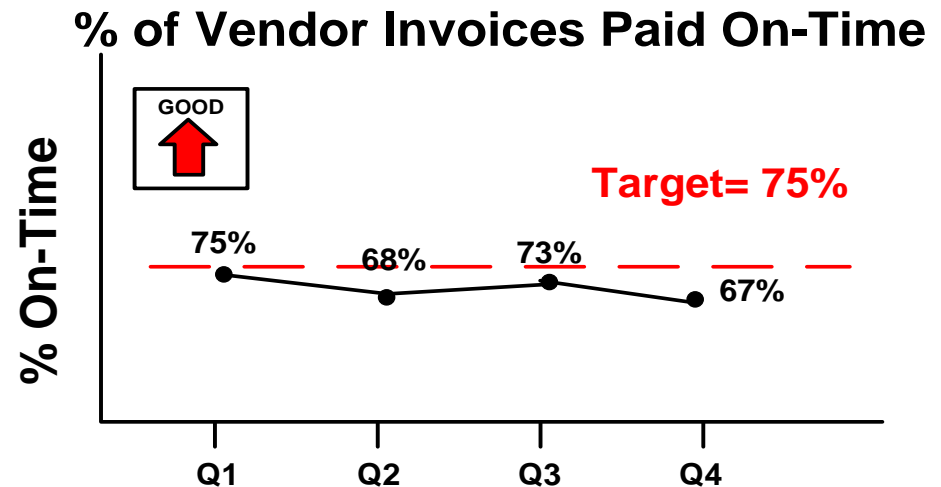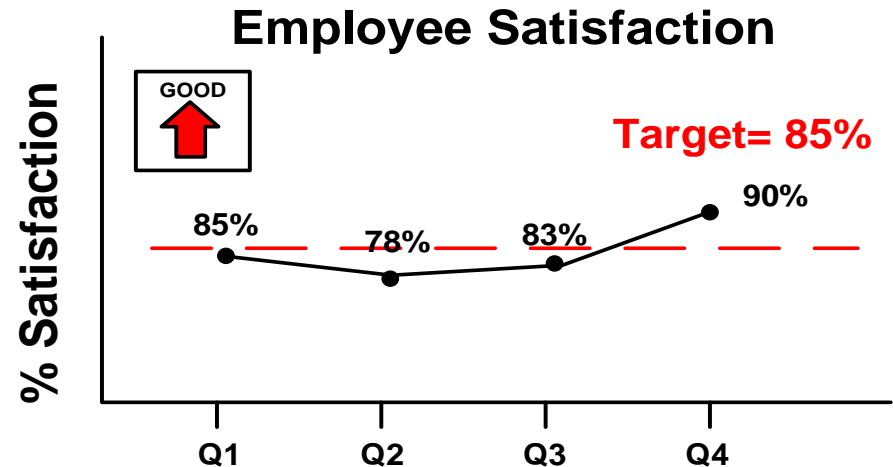
So, how do we make line graphs move?

Employee Satisfaction

GOOD

Target= 85%

85%   78%   83%   90%

Q1   Q2   Q3   Q4

% Satisfaction

% of Vendor Invoices Paid On-Time

GOOD

Target= 75%

75%   68%   73%   67%

Q1   Q2   Q3   Q4

% On-Time

MIAMI-DADE COUNTY

Lean Six Sigma - Principles

1. Manage with Facts - All employees should base decisions on objective data, not instinct or "gut feel" whenever possible. Also, managers must ensure that a disciplined system is in place to manage with the data or facts.

2. PDCA (Plan-Do-Check-Act) - The continuous improvement cycle consists of four stages:
- **P**lan the work,
- **D**o the plan,
- **C**heck the results of the worked plan, and
- **A**ct to apply lessons and improve the results of the plan.
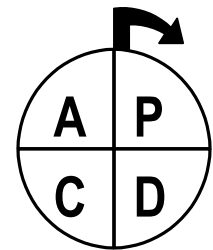
3. Respect for People - Everyone must listen to all ideas and promote the creativity, self-motivation, and the limitless potential of others. Treat others as you would like to be treated and respect the ability of others to produce ideas and contribute to the organization. Think and act as a team player. If the team wins - the individual wins.

4. Focus on Customer - Not only must we satisfy the needs and expectations of customers, we should strive to anticipate those needs. The prevailing attitude must be that the customer and other stakeholders come first.

MIAMI-DADE COUNTY

Lean Six Sigma Components

Moving line graphs requires efforts in three areas…

Strategic Planning helps us "focus" on key projects to reach our **Vision.**

Process Management helps us maintain good results as we perform our **Mission.**

Performance Improvement helps us fix work problems and improve our **Performance.**

Strategic Planning

Lean Six Sigma

Process Management

Performance Improvement
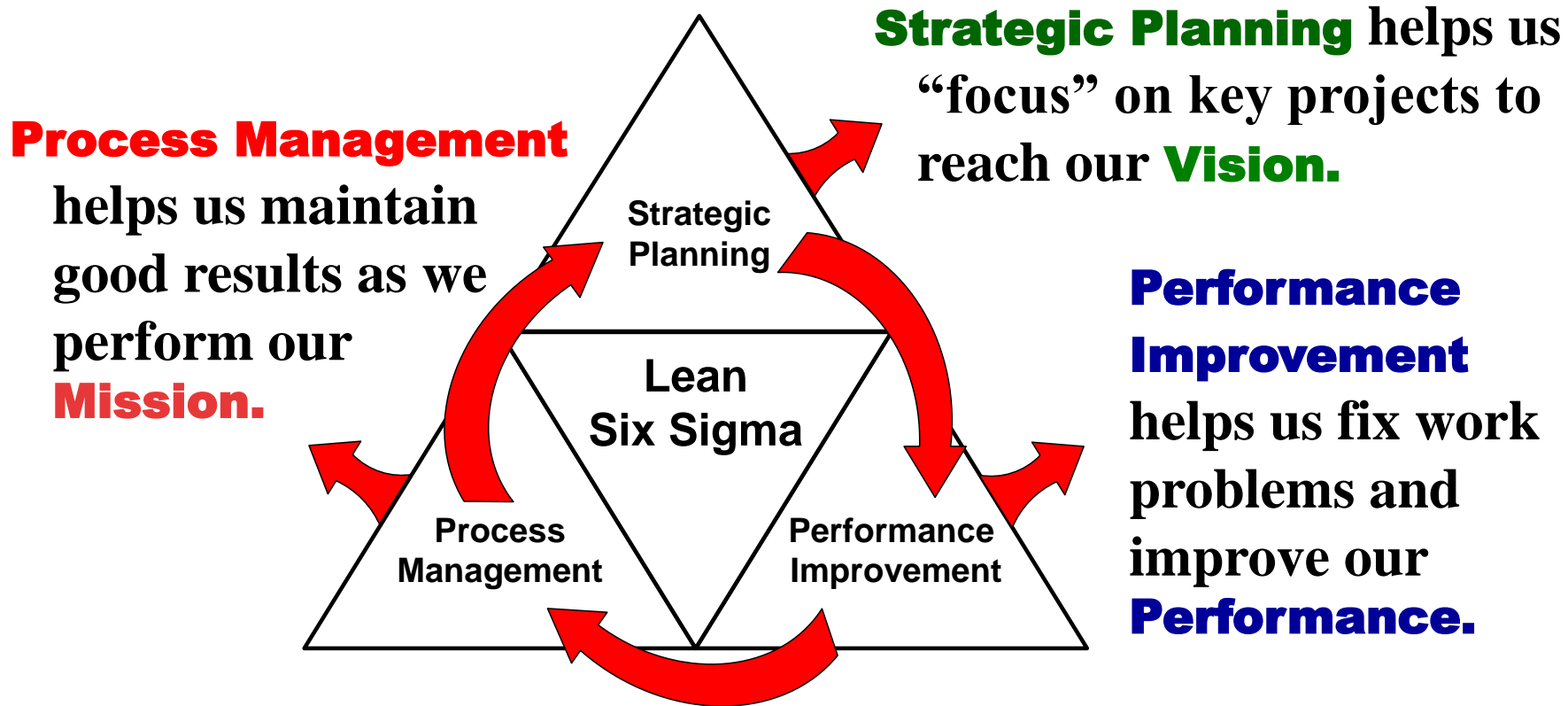
We will focus on the Performance Improvement Component for this Yellow Belt Training.

MIAMI·DADE COUNTY

LSS Component: Performance Improvement

Green Belt teams will utilize the **Six Sigma** 5 step problem solving **DMAIC** process:

1) **D**efine

2) **M**easure

3) **A**nalyze

4) **I**mprove

5) **C**ontrol

DMAIC 5 Steps
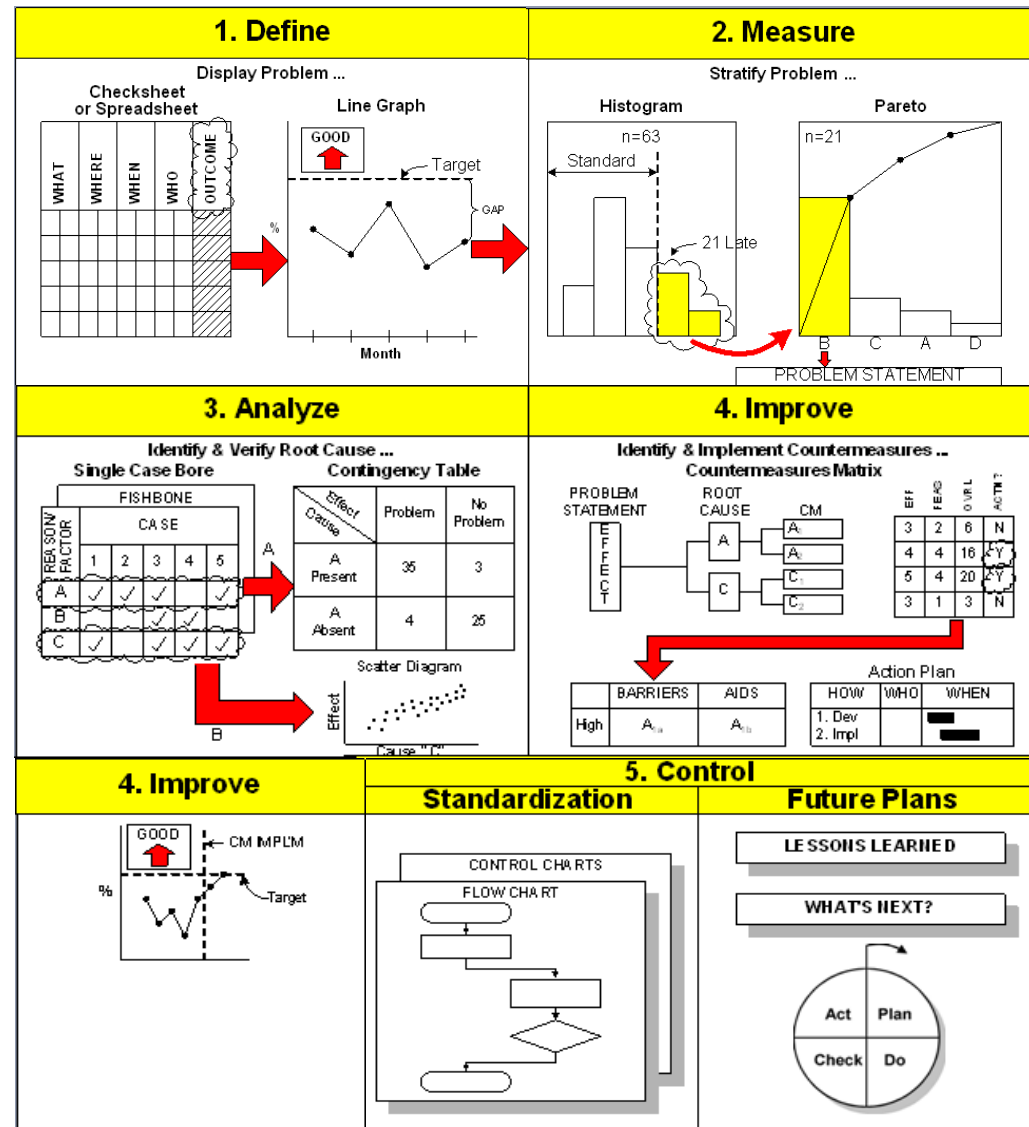
DMAIC Process Step 1: Define

The objective of step 1 is to "Demonstrate the importance of improvement needs in measurable terms."

1. Define

Display Problem ...

Checksheet or Spreadsheet

WHAT	WHERE	WHEN	WHO	OUTCOME

Line Graph

GOOD

%

Target

GAP

Month
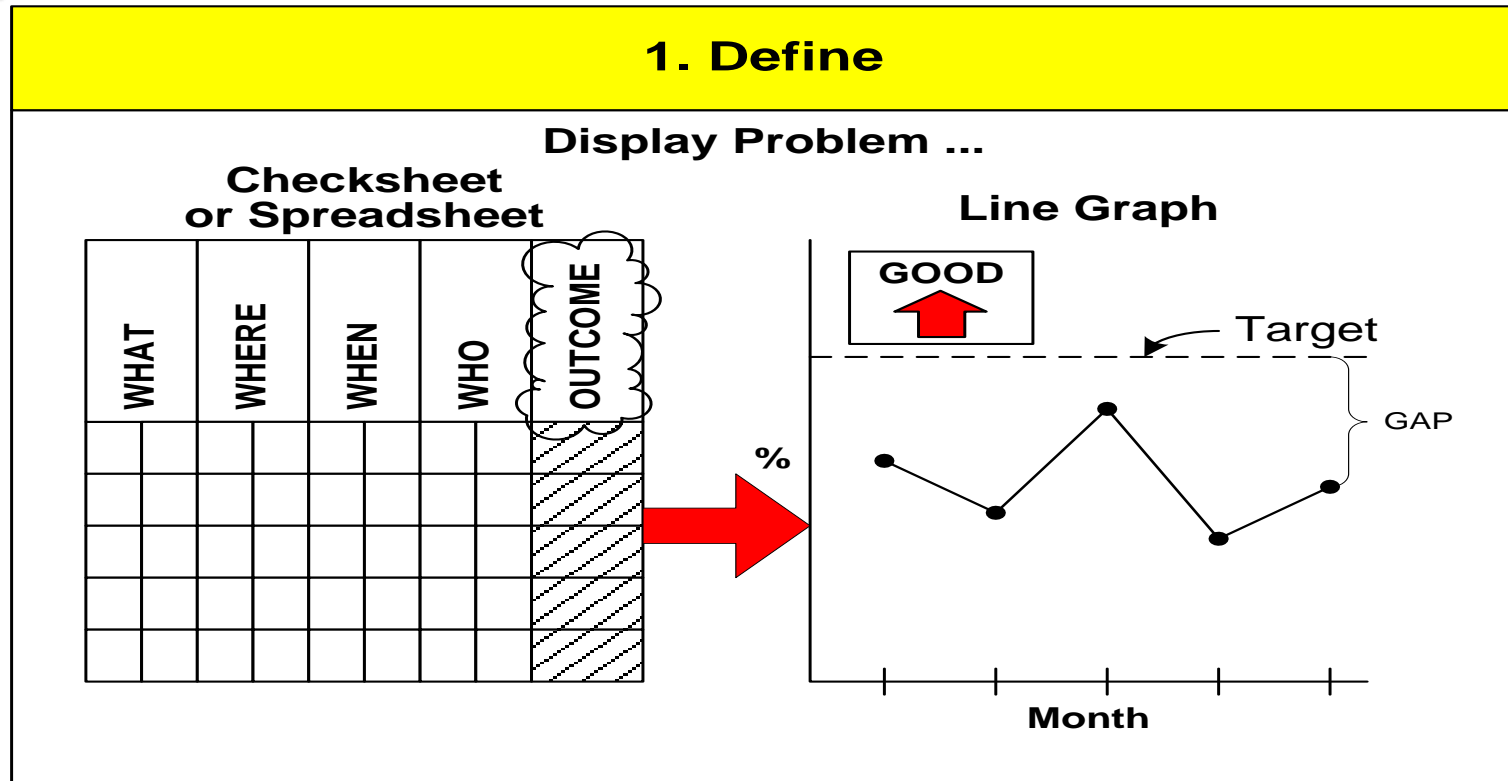
Lets look more closely at the Spreadsheet and Line Graph tools.

MIAMI-DADE COUNTY

LSS Tool : Spreadsheet

Spreadsheets capture demographic data (e.g. *When, What, Where* and *Who*) related to a process or problem**.**

Construction Related Vendor Payments

A	DEMOGRAPHICS									
Line #	WHEN					WHAT	WHERE		WHO	
	B	C	D	E	F	G	H	I	J	K
	Invoice Received Date	Day of Week	Paid Date	Day of Week	Days to Pay	Work Type	Work Location (N,S,E,W)	Invoice Delivery Location	Project Manager	CCMS Liason
1	12/7/2012	Friday	4/12/2013	Friday	126	Resurfacing	E	MLK	Paul	Gonzalo
2	9/5/2012	Wednesday	11/23/2012	Friday	79	Sidewalks	W	MLK	Paul	Jason
3	6/8/2012	Friday	10/12/2012	Friday	126	Signals	S	MLK	Susan	Gonzalo
4	4/13/2012	Friday	7/5/2012	Thursday	83	Sidewalks	S	MLK	Paul	Gonzalo

For "When" columns consider:
- Calendar time (date, time, day of week)
- When in the Life Cycle
- When in the Process
- Duration (# of seconds, weeks, days, etc.)

For "What" columns consider:
- Type, Category
- Complexity, Severity
- Priority
- Cost Level
- Group, Amount

For "Where" columns consider:
- Location (County, city, address, district, etc.)
- Type of Location (inside, outside, facility, etc.)
- Where is Defect in the Object

For "Who" columns consider:
- Customer
- Worker/Supervisor
- Employee Name
- Employee Position, Classification, Experience
- Gender, Race, Age

MIAMI-DADE COUNTY

LSS Tool: Line Graph

% of Vendor Payments Issued On Time - PWWM 2013

Target = 90%

GAP
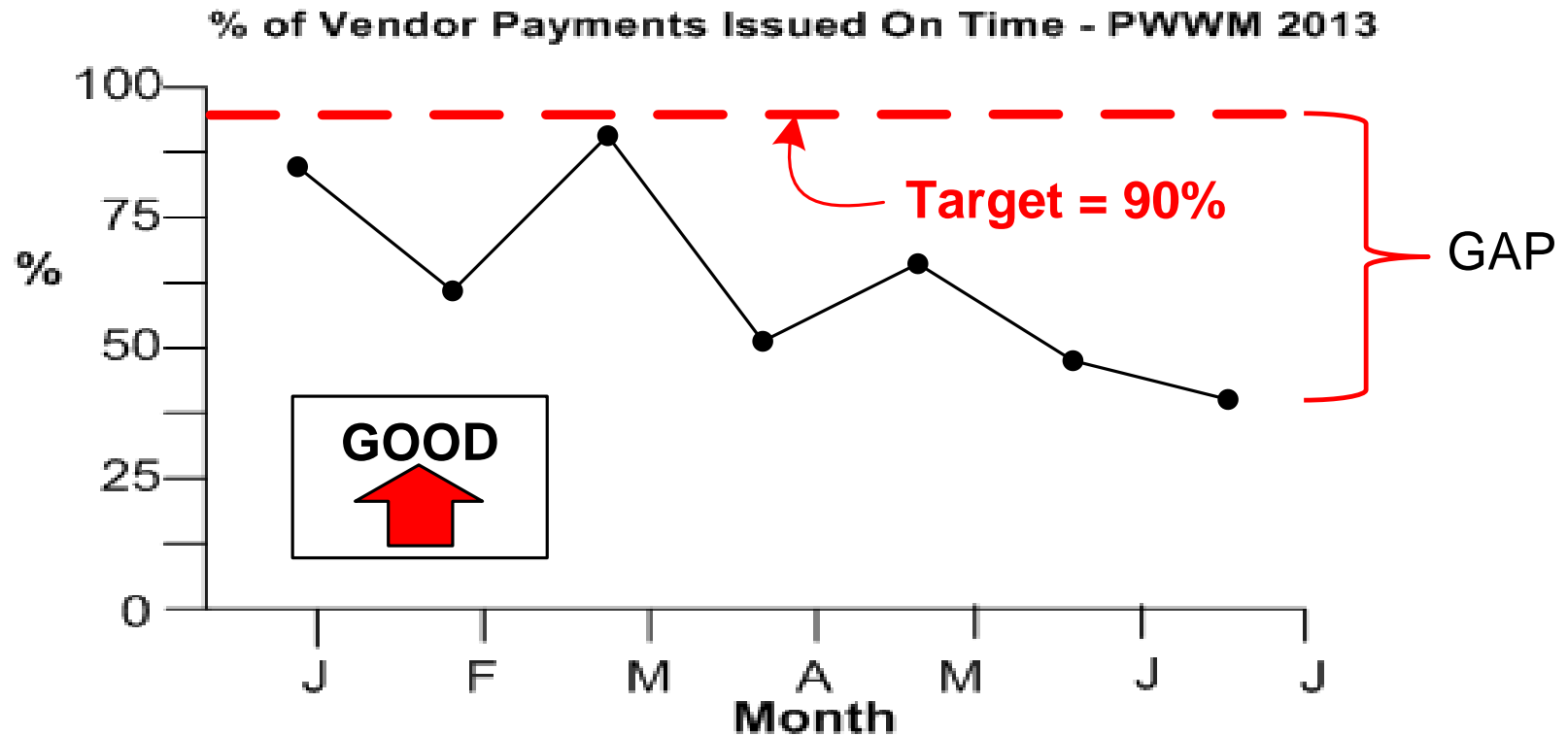
GOOD

A well designed outcome Line Graph indicator has …

- Clear labels showing what is being measured and when

- Data points connected by a line

- Target info., a "Good Direction Arrow" and a labeling of the gap in performance between the Target and actual data

MIAMI-DADE COUNTY

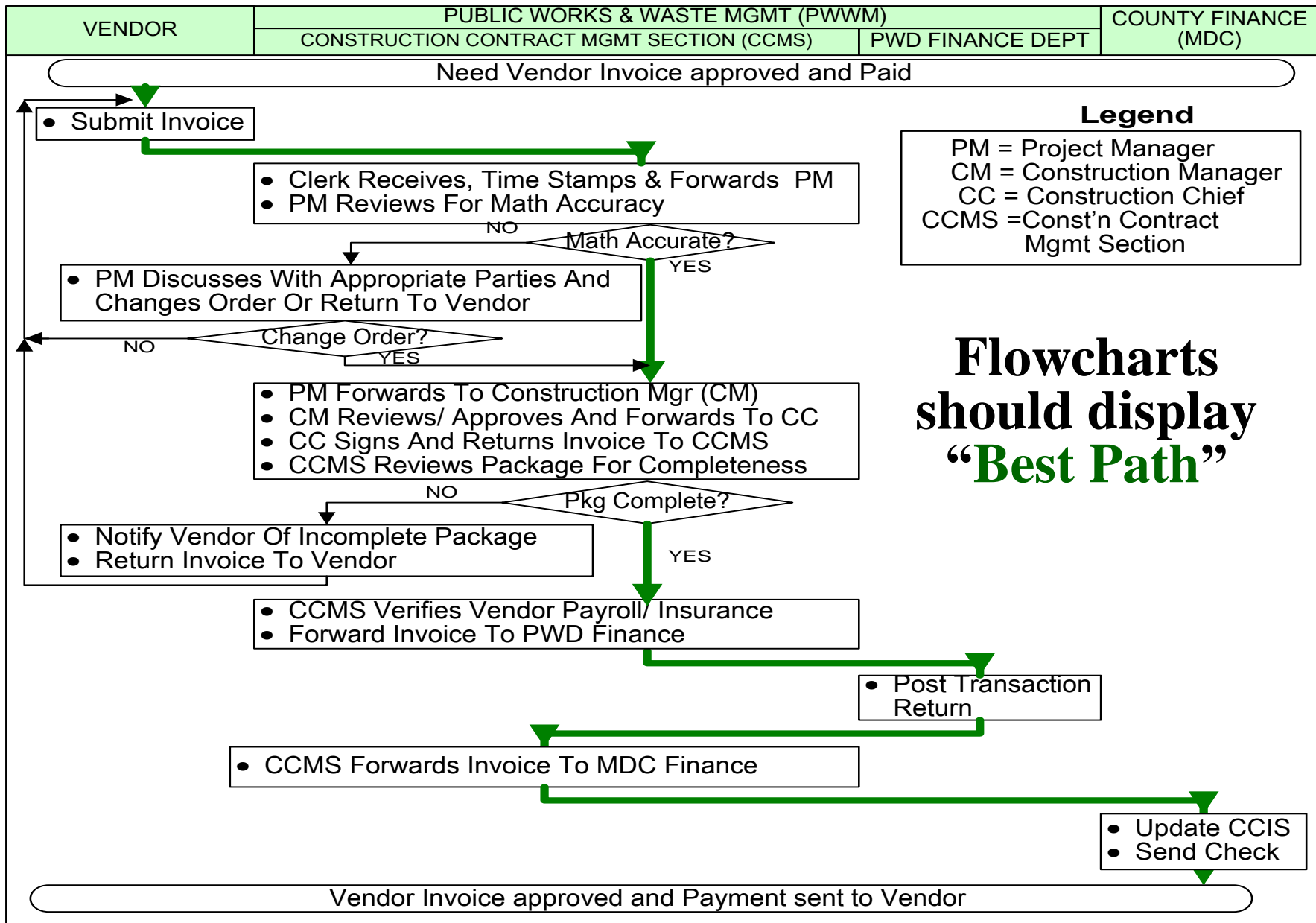# LSS Technique: Process Flowchart

Process flowcharts describe activities needed to provide services and …

- ◆ identify workers involved.

- ◆ start with a need for a *desired outcome*.

- ◆ end with the *desired outcome* being achieved.

- ◆ describe the "best path" for workers to follow to achieve the *desired outcome*.

- ◆ describe other activities that may be required to achieve the *desired outcome*.

- ◆ Keep in mind shapes have specific meanings. Will make reading flow chart *easier.*

Pay Invoice

ACCOUNTS PAYABLE OFFICER	VENDOR

Need To Obtain Complete Information To Pay Invoice

- Receive Invoice
- Review Invoice Against Rqmts

Sufficient Info to pay?

No

Yes

- Contact Vendor

- Discuss and Resolve Issues

- Authorize Invoice for Payment

Information Obtained To Pay

COUNTY

Pay Vendor Invoices

VENDOR	PUBLIC WORKS & WASTE MGMT (PWWM)		COUNTY FINANCE (MDC)
	CONSTRUCTION CONTRACT MGMT SECTION (CCMS)	PWD FINANCE DEPT	

Need Vendor Invoice approved and Paid

- Submit Invoice

- Clerk Receives, Time Stamps & Forwards PM
- PM Reviews For Math Accuracy

NO — Math Accurate? — YES

- PM Discusses With Appropriate Parties And Changes Order Or Return To Vendor

NO — Change Order? — YES

- PM Forwards To Construction Mgr (CM)
- CM Reviews/ Approves And Forwards To CC
- CC Signs And Returns Invoice To CCMS
- CCMS Reviews Package For Completeness

NO — Pkg Complete? — YES

- Notify Vendor Of Incomplete Package
- Return Invoice To Vendor

- CCMS Verifies Vendor Payroll/ Insurance
- Forward Invoice To PWD Finance

- Post Transaction Return

- CCMS Forwards Invoice To MDC Finance

- Update CCIS
- Send Check

Vendor Invoice approved and Payment sent to Vendor

Legend

PM = Project Manager
CM = Construction Manager
CC = Construction Chief
CCMS =Const'n Contract Mgmt Section

Flowcharts should display "Best Path"

24

The objective of step 2 is to "Investigate the features of the indicator, stratify the problem and set a target for improvement."
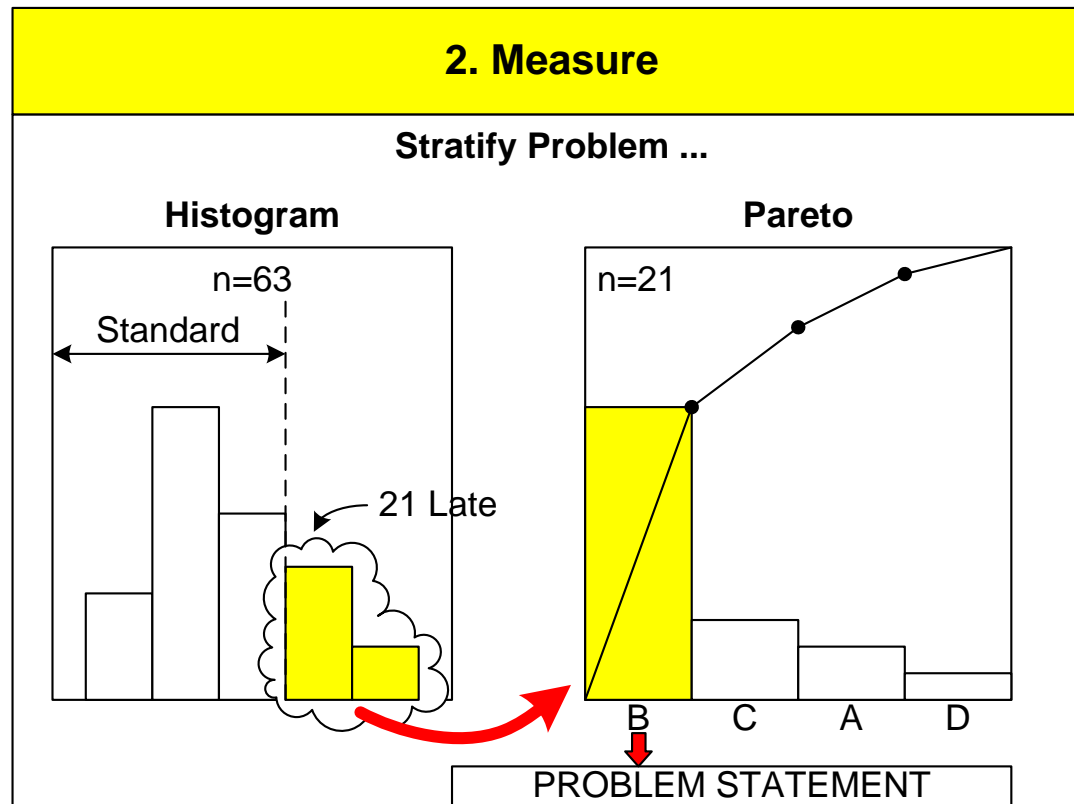
Lets look more closely at the Histogram and Pareto tools.

LSS Tool : Histogram School Example

What is it?

It is a distribution (bell shape curve) of process outputs displaying the spread of outputs around an average *(e.g. school test scores, vendor payments, etc.)*

Algebra Test Scores

n = 23
mean = 54
std dev = 11.6

x̄

# of Student Tests (y-axis, 0 to 10)

8

5

4

3   3

F's   D's   C's   B's   A's

Test Scores (x-axis: 20, 30, 40, 50, 60, 70, 80, 90)
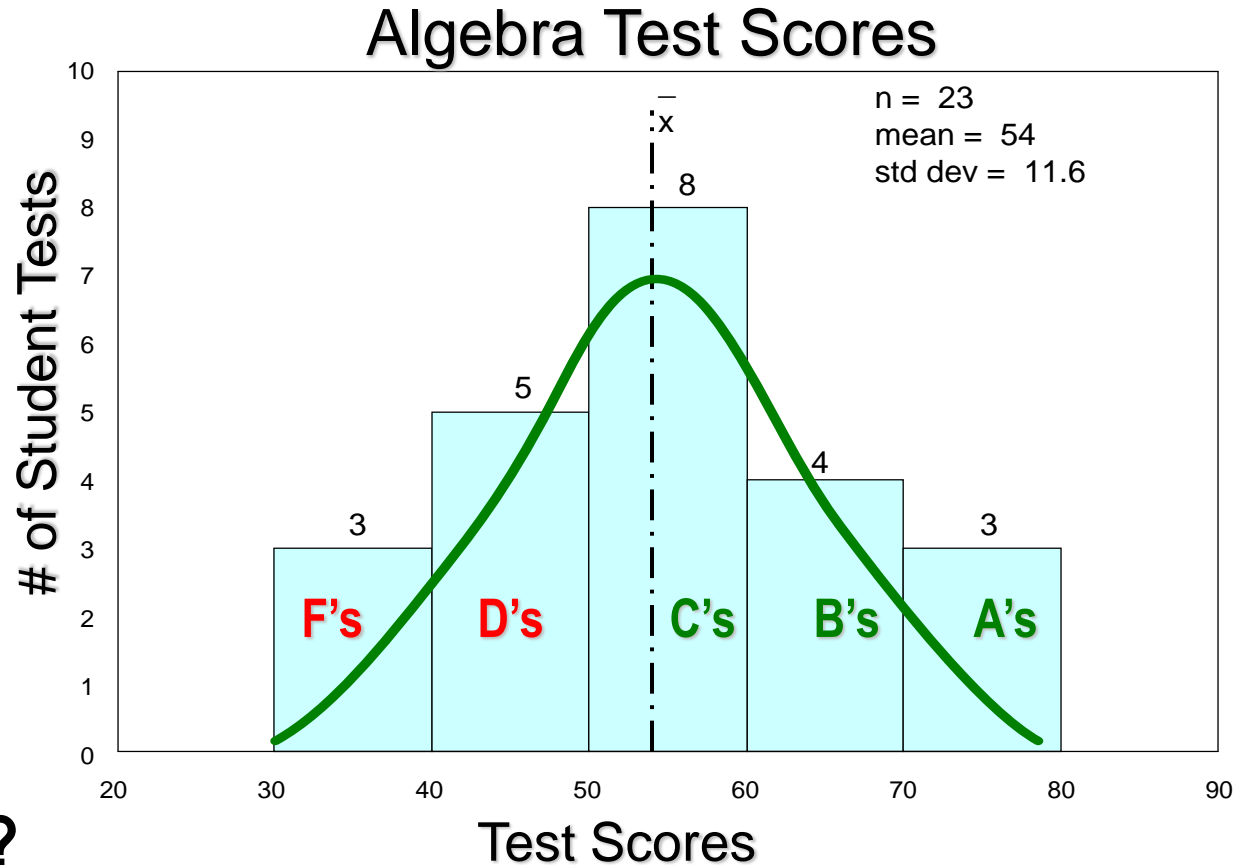
When is it used?

1. To measure "Process Performance" *(e.g. Average Score= 54)*

2. To stratify (or separate) process "Bad Outputs" from "Good Outputs"

MIAMI·DADE
COUNTY

26

What does this Histogram tell us about the Vendor Payment Process?

Vendor Payments

# of Vendor Payments (y-axis)

On-Time Specification 14 Days

n = 502
mean = 12.2

68 · 107 · 192 · 77 · 58

(155 Late Payments)

# of Days to Pay Vendor
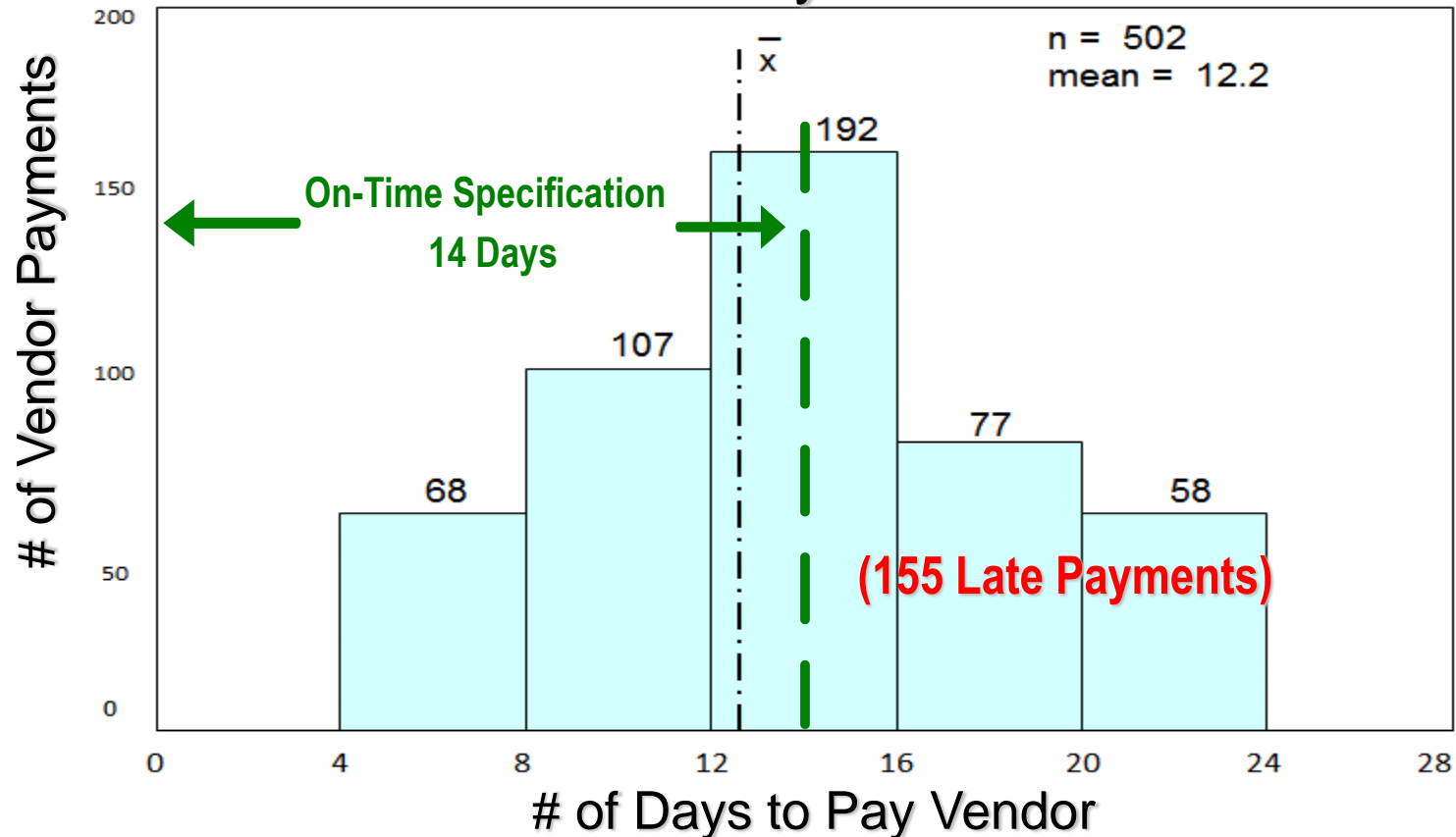
1. What is the "Process Performance"?
Process averages 12.2 days & produces 70% of payments (347 of 502) on-Time)

2. What outputs would you separate out?   **(155 Late Payments)**

MIAMI-DADE COUNTY

27

LSS Tool: Histogram *(Distribution Types)*
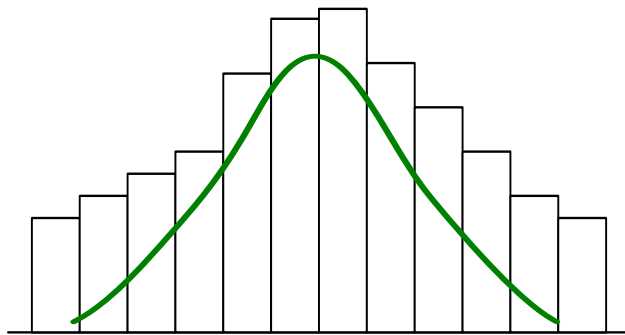
Normal (process outputs vary evenly around an average)
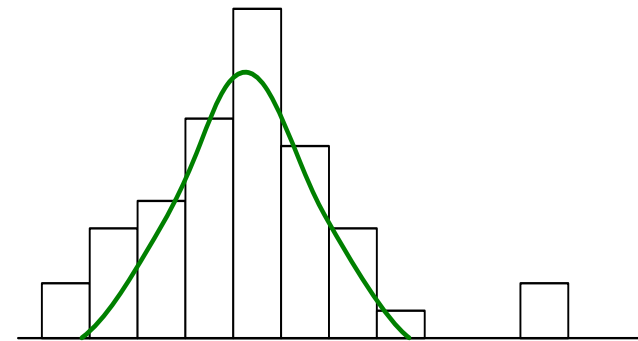
Outlier (investigate output that may not be normally part of process)

Can you see the Normal distributions below?
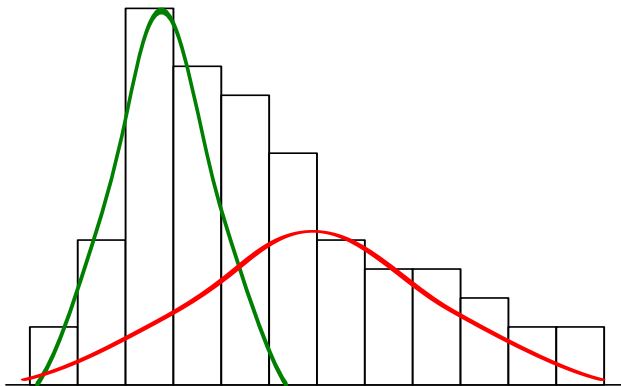
Skewed (2 normal distributions are mixed…separate them before analysis)
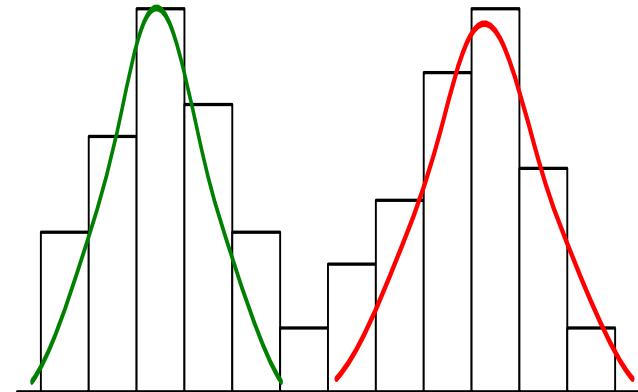
Bi-Modal (2 distributions, select one to analyze 1st)

MIAMI·DADE COUNTY

Histogram (Human Histogram Exercise)

Purpose: To practice constructing a histogram

Agenda:

1. On a sheet of paper write your height in "inches" (round up to nearest inch)

2. Follow instructor's directions and the histogram construction process *(Follow-along using guide on next slide)*

3. What is the central tendency of the distribution (mean or average, median, mode and modal class)

Limit: In teams (or full group): 20 Minutes

MIAMI-DADE COUNTY

Histogram (Histogram Exercise)

Histogram Construction Procedure

1. Select data
2. Sort data low to high:
3. n=
4. Range= (maximum data point)-(minimum data point)=
5. Class= K=square root of n =   *(Round up for # of bars)*
6. Width=W= range / K   *(Round up for width of each bar)*
7. Starting point= (minimum data point) – ½=
8. Mean= (sum all data points) / n=

Yellow Belt Class

# of Participants

0

St Pt

Height in Inches

30

Source
- What:
- Who
- When

MIAMI·DADE COUNTY

LSS Tool: Pareto
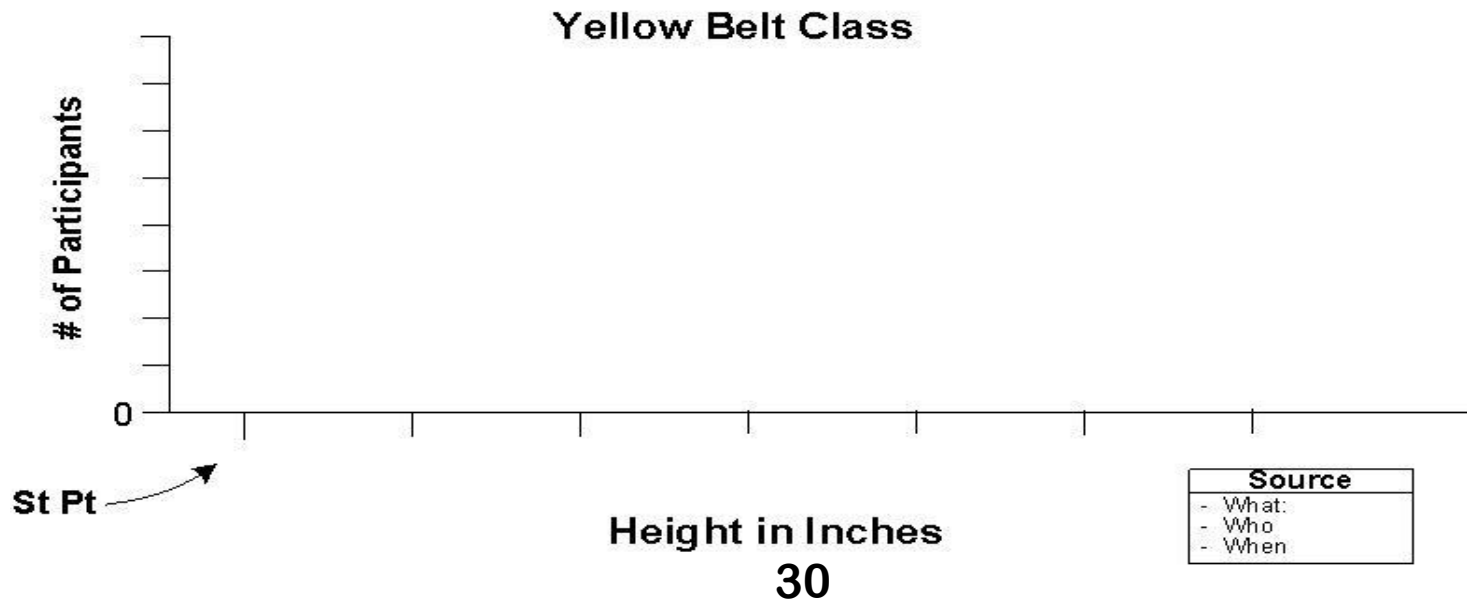
- 1897 . . .   Italian Economist, Vilfredo Pareto, presented a formula showing that the distribution of income is uneven (i.e., the largest share of the world's income is held by small number of people).

- 1907 . . .   U.S. Economist, M. C. Lorenz, expressed a similar theory in a diagram.

- Later . . .   Quality Control expert, Dr. J. M. Juran, applied Lorenz's diagram method to classify problems of quality into "vital few" versus the "trivial many".

MIAMI-DADE COUNTY

LSS Tool: Pareto

Late Payment to Vendors - 2013

Let's drill down further on the drainage payments.
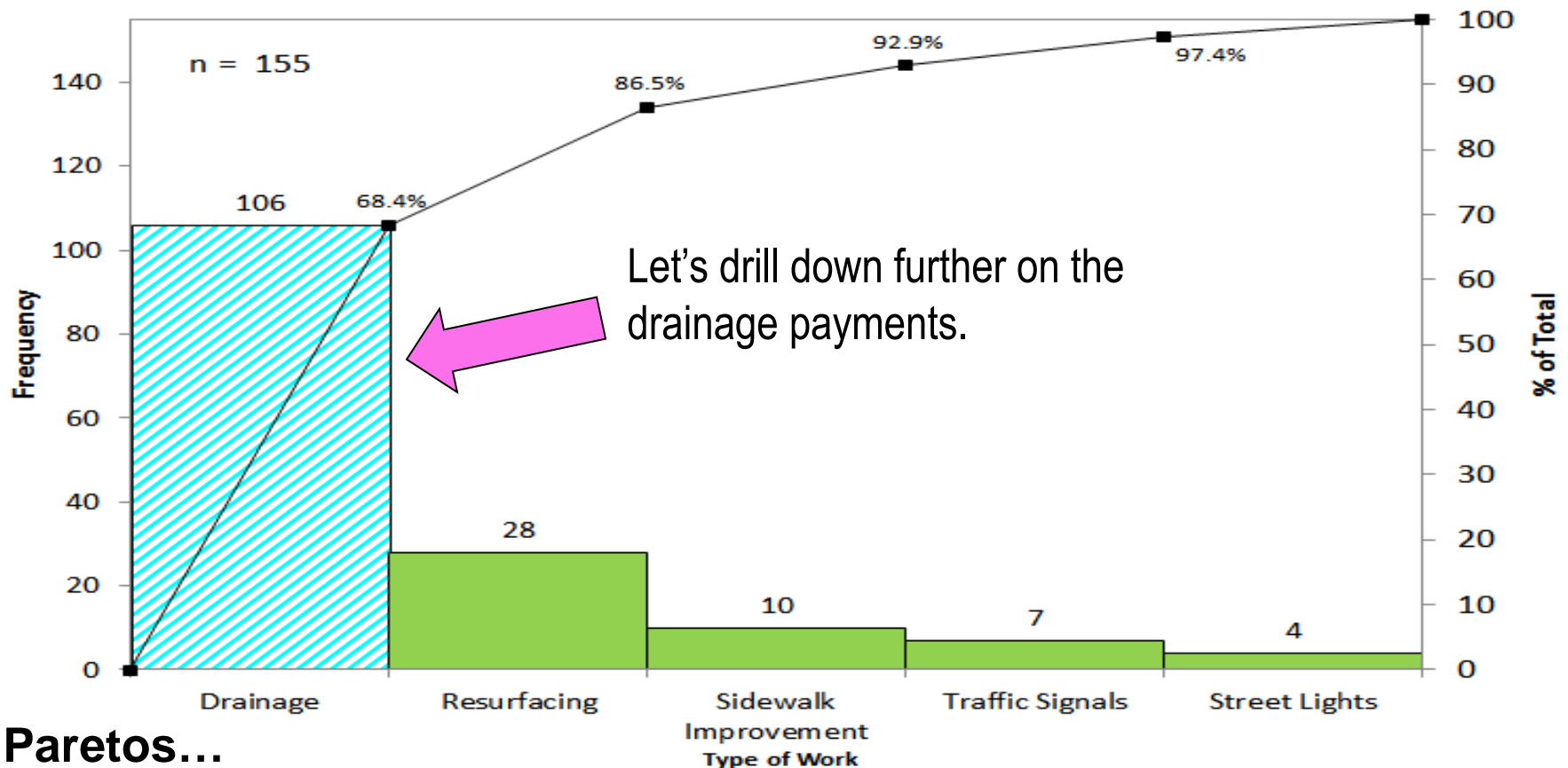
Paretos…

- **Summarize groups of items** in order from highest to lowest
- **Separate the "significant few"** group(s) from the "trivial many" (i.e. 80-20 Rule…80% of pain is caused by 20% of groups)
- **Assist problem solvers in "drilling down"** from What, Where, When and Who viewpoints searching for a "large bar" or "young mountain".

The Pareto – Construction Procedure

1) Draw a box.
2) Display the number of items (e.g. n=106).
3) Title the PARETO with the answer to the Question," What is n?"…(i.e. What are the 106?)
4) Label the sides of the box:

   a. Left side: Number of _____ Construct a measurement scale on the left side starting with zero at the bottom and the "n" (e.g., 106) value at the top. Add additional appropriate scale values on the left side.

   b. Bottom side: Label with the name of the What, Where, When or Who data group to be displayed (e.g., Type of Work Invoiced). Draw each bar at the appropriate height descending from the left starting with the biggest bar. Label each bar and display bar height values above each bar.

   c. Right side: Label this side "Cumulative Percentage" and display measurement grids at 0%, 25%, 50%, 75% and 100%.

   d. Construct a "Cumulative Percentage" line: Line starts in lower left corner at "zero" and connects labeled data points plotted at or directly above the upper right corner of each bar and at a height equal to the cumulative percentage, calculated as follows: % = (bar heights of all bars to left data point) ÷ (the total n) * 100 (e.g., (76+20) ÷ (101) * 100 = 96%).

5) Add a source box.

Late Payments to Vendors for Drainage - 2013
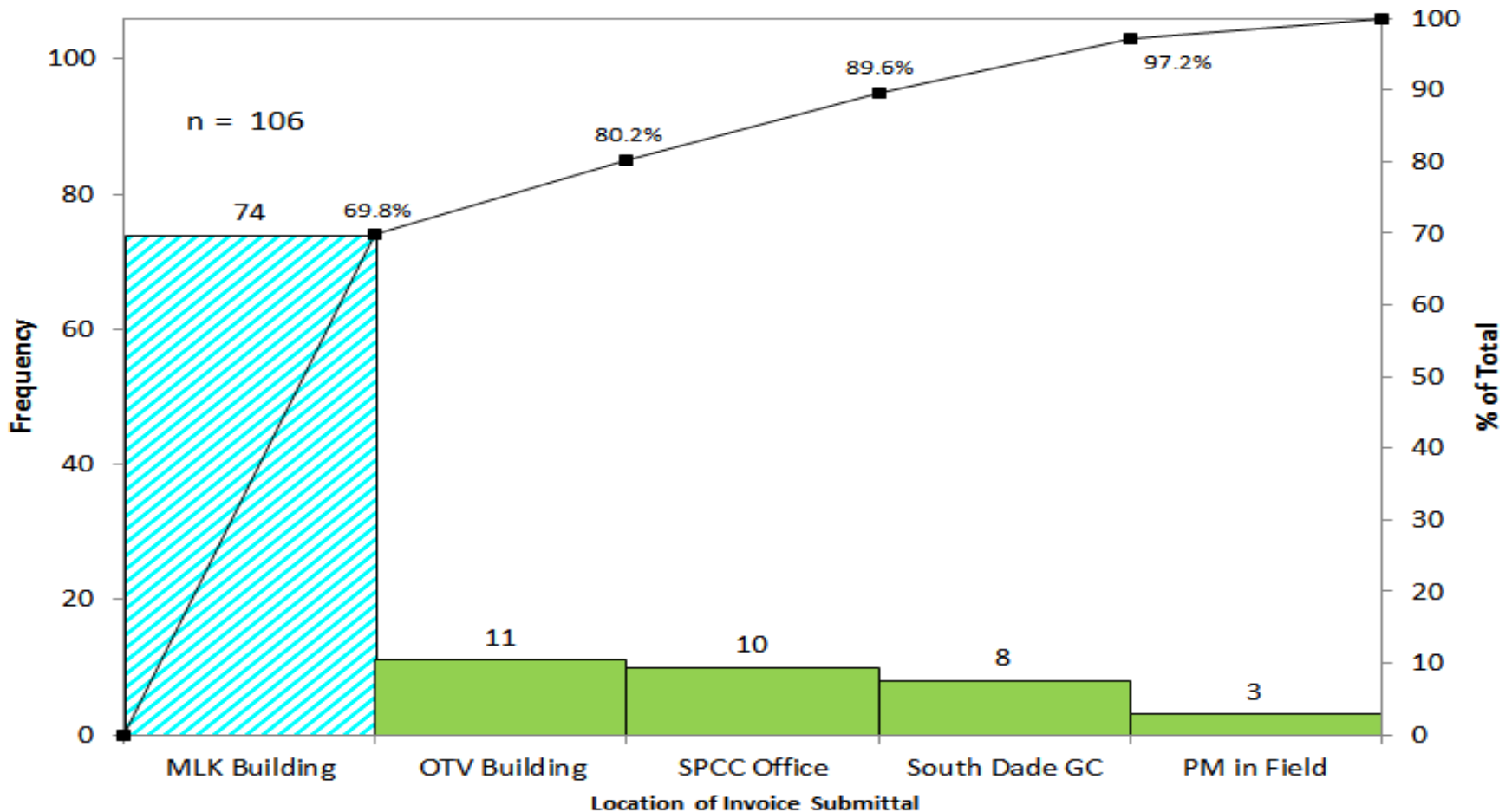
Problem Statement: 70% of invoices paid late for drainage work were initially submitted for processing in the MLK Building.

34

Morning Summary

Green Belt teams use a Six Sigma 5 step problem solving **DMAIC** process. The first 2 steps are **D**efine and **M**easure and often use 4 tools:

1. Define	2. Measure
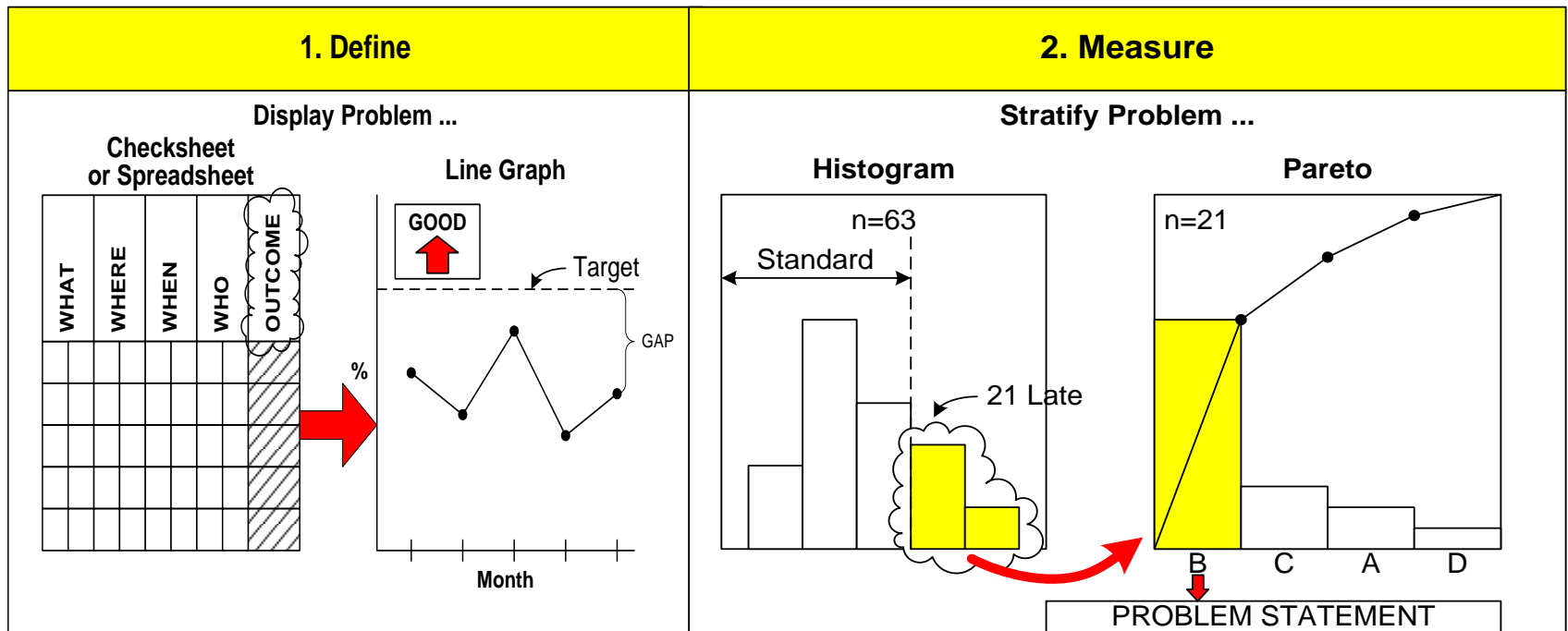
Spreadsheets help organize process data

Line Graphs display the Performance GAP

Histograms help us drill down on bad outputs.

Paretos also help us drill down on bad outputs

35

The objective of steps 3, 4 and 5 are to identify root causes, identify and implement solutions and locking in the gains made over time.

3. Analyze: *Study the stratified data to identify and verify the root cause of your problem*

4. Improve: *Develop and implement countermeasures to eliminate the verified root cause of the problem*

5. Control: *Prevent the problem and its root causes from recurring*
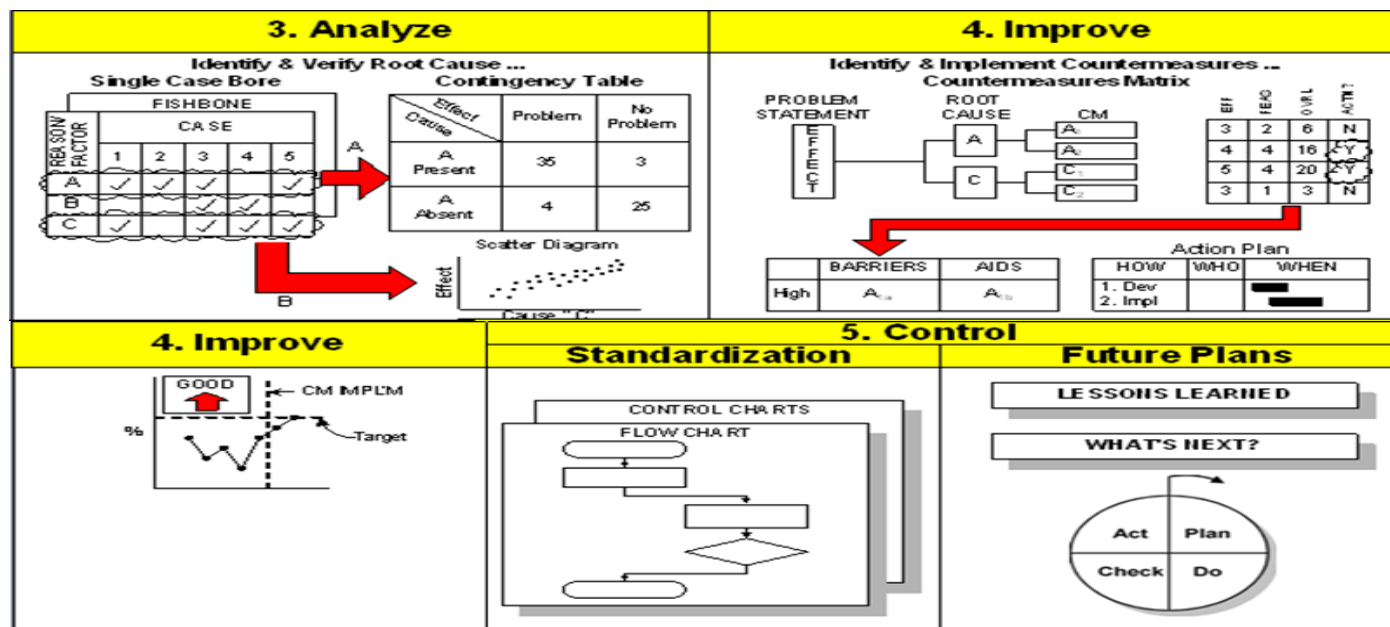
Lets look more closely at the Single Case Bore and the Fishbone Diagram tools.

LSS Tool: Single Case Bore

Single Case Bore Analysis

Instructions to Team: Erase the example factors and x's below and secure Invoice documentation and the attached spreadsheet and interview knowledgeable invloved workers as needed before completing this Single Case Bore Analysis

Problem Statement: 70% of invoices paid late for drainage work were initially submitted for processing in the MLK Building.

Reasons or Factors *(That possibly contributed to late payment)*	104219	104224	104485	104488	104829	104830	105437	105446	105637	105639	105720	105731	106017	106315	106364	106578	106726	106579	106870	106892	Total	Percentage
1) Invoice took more than five working days for PM to verify quantities after initial submittal	x	x			x			x					x	x		x	x	x	x		10	50%
2) Key staff on vacation		x			x			x							x						4	20%
3) Funding authority exhausted			x							x						x					3	15%
4) Internal processing time lag noted in case files				x										x						x	3	15%
5) New federal funding requirements not followed				x									x								2	10%
6) Change order not on file										x							x				2	10%
7) Subcontractor payrolls not submitted. Invoice returned to vendor			x			x	x	x	x			x		x	x				x	x	10	50%
8) Insurance documentation not complete						x						x									2	10%

Sampled 20 of the 74 late payments

37

MIAMI-DADE COUNTY

Sources of All Root Causes

Where do Root Causes Come From?

Standards Failed

People Failed the Standard

No Standard	Standard Poorly Designed	Standard Out of Date	People not trained	People Poorly Trained	People failed (despite having appropriate standards and training)

The goal is to identify and address root causes not symptoms.

MIAMI-DADE COUNTY

LSS Tool: Fishbone Diagram

The answer to the question "Why?" should lead to a standard or people failing the standard

Invoice took more than five days for PM to verify quantities

Why?

PMs no longer at MLK. Delay in forwarding to PMs for review

Why?

Process for forwarding invoices to PMs is out of date.

70% of invoices paid late for drainage work were initially submitted for processing in the MLK Building

Invoices returned because Sub-contractor payrolls not submitted.

Why?

Vendors not aware of subcontractor payroll requirement and consequence.

Why?

Instructions regarding invoice submittal are poorly designed.

MIAMI-DADE COUNTY

39

LSS Technique: Brainstorming

Brainstorming is a technique to generate many diverse ideas using a team or group of employees using two (2) principles and several rules:
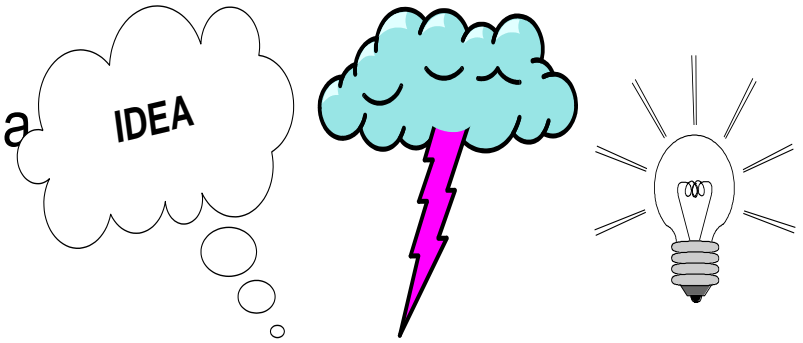
- **Delayed Judgment** - People are able to produce more ideas when they delay evaluation of ideas until a later time.

- **Extended Effort** - More original and useful ideas are created when the group continues to generate ideas beyond the initial, more obvious responses. The emphasis is on "quantity" of ideas not the "quality."

- **"Brainstorming Rules"**
  - State ideas briefly and clearly.
  - All Ideas recorded
  - Build on recorded ideas.

40

LSS Technique: Brainstorming Procedure

The Leader….

1. **Selects the brainstorming method**: **Round Robin** (go around group in order for responses); **or Green Light** (allow anyone to respond anytime)

2. **Makes the topic visible, selects recorder**

3. **Reviews brainstorming rules:** State ideas briefly. build on recorded ideas and all ideas are recorded.

4. **Leads the group through three phases:**

   a) **Generation Phase** – Post ideas on the flip chart, whiteboard or screen.

   b) **Clarification Phase** - Go over the list to make sure that everyone understands all of the items.

   c) **Evaluation Phase** - Eliminate duplications, irrelevancies and issues that are off limits or cannot possibly be addressed or acted upon by this team.

MIAMI·DADE COUNTY

Improvement Exercise Using Brainstorming

Purpose: Use brainstorming to identify potential solutions to identified root causes of our vendor payment problem statement

Agenda:

1. Each group selects facilitator and recorder.

2. Brainstorm potential solutions to root causes that impede the payment of vendors. Refer to the Vendor Payment Process Flowchart earlier in presentation.

3. Record input on brainstorming form located in pocket of folder.

Limit: Full group: 30 Minutes

MIAMI-DADE COUNTY

Improvement Exercise: Develop Countermeasures

Based on your brainstorming, use this form to develop and prioritize counter measures for your selected root causes.

Problem Statement	Root Cause	Countermeasure	1-lowest 5-highest Rankings			
			Effectiveness	Feasibility	Overall (Effectiveness x Feasibility)	Take Action (Y or N)
70% of invoices paid late for drainage work were initially submitted for processing in the MLK Building	Process for forwarding invoices to PMs is out of date					
	Instructions regarding invoice submittal are poorly designed					

MIAMI-DADE COUNTY

Case Study from a Green Belt Team

Team Name and Logo   Improvement Area

The Incredible Bulk   Bulky Trash Pick-ups

Trash Talkers   Waste Disposal

The "Roadsters"   Road & Bridge Repairs

Procurement Xpress   Contract Procurement

On-Time Payment Services (OPS)   Vendor Payments

For Six Sigma, it's worth it.

The Empire Strikes Back   Garbage/Trash Collections

MIAMI-DADE COUNTY

Summary

- **Lean Six Sigma (LSS) is a proven methodology** that will help us improve our work processes.
- **Miami-Dade County will train and certify employees** as **Yellow Belts**, **Green Belts**, or **Black Belts**.
- **Green Belt improvement teams will utilize the DMAIC process**, a five step problem solving Six Sigma methodology.
- **LSS tools and techniques** used by Green Belt teams include:
  - *Spreadsheet* … to help gather What, Where, When and Who demographic process data
  - *Line Graph* … to display performance GAP and trends
  - *Flowchart* … to map the process and display "Best Path"
  - *Histograms and Paretos* … to "Drill Down" on data to help identify problem statement
  - *Single Case Bore and Fishbone* … to further determine root cause(s) to problems
  - *Brainstorming* … to engage employees to identify improvements

MIAMI-DADE
COUNTY

What did you learn today?

Congratulations!

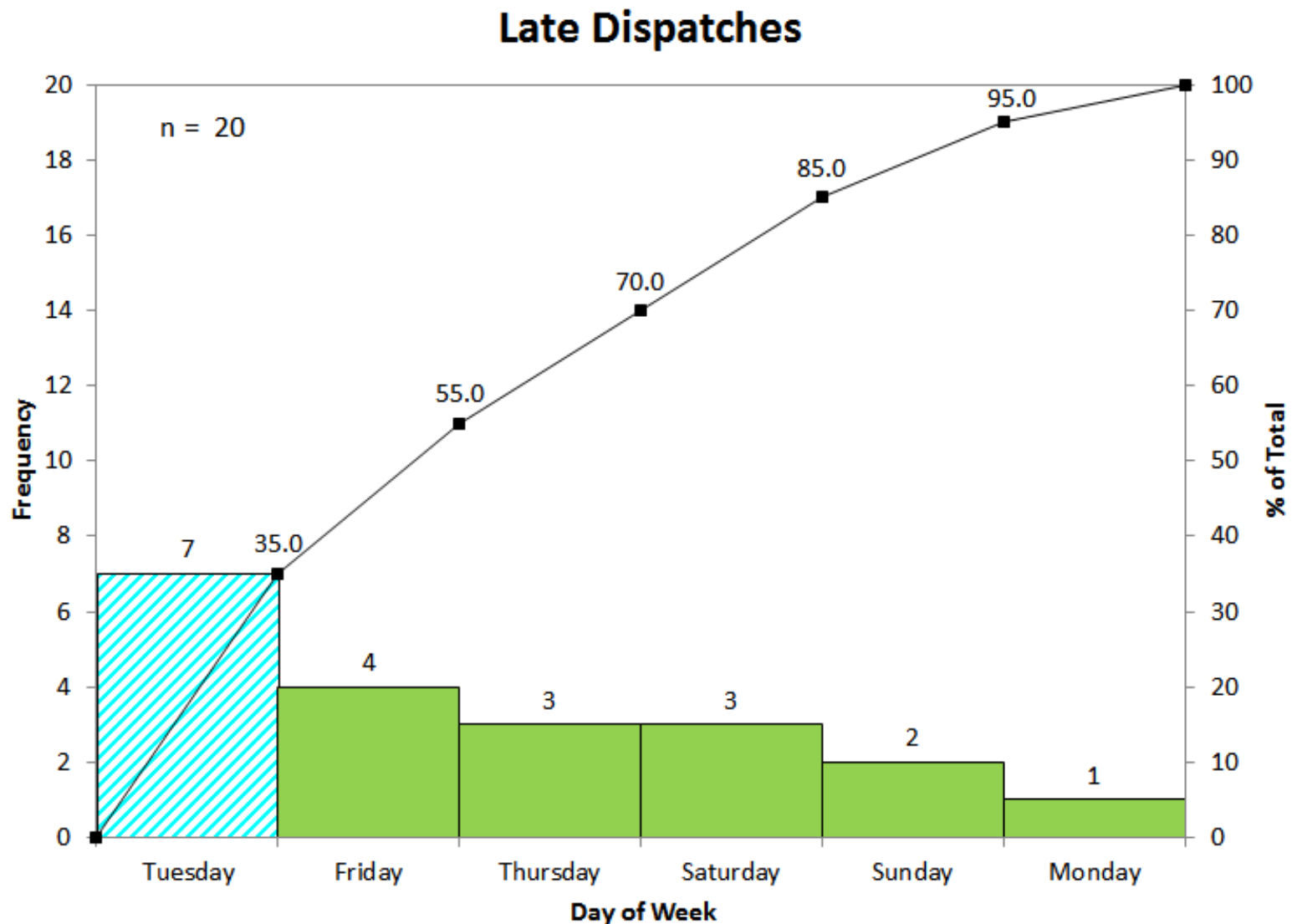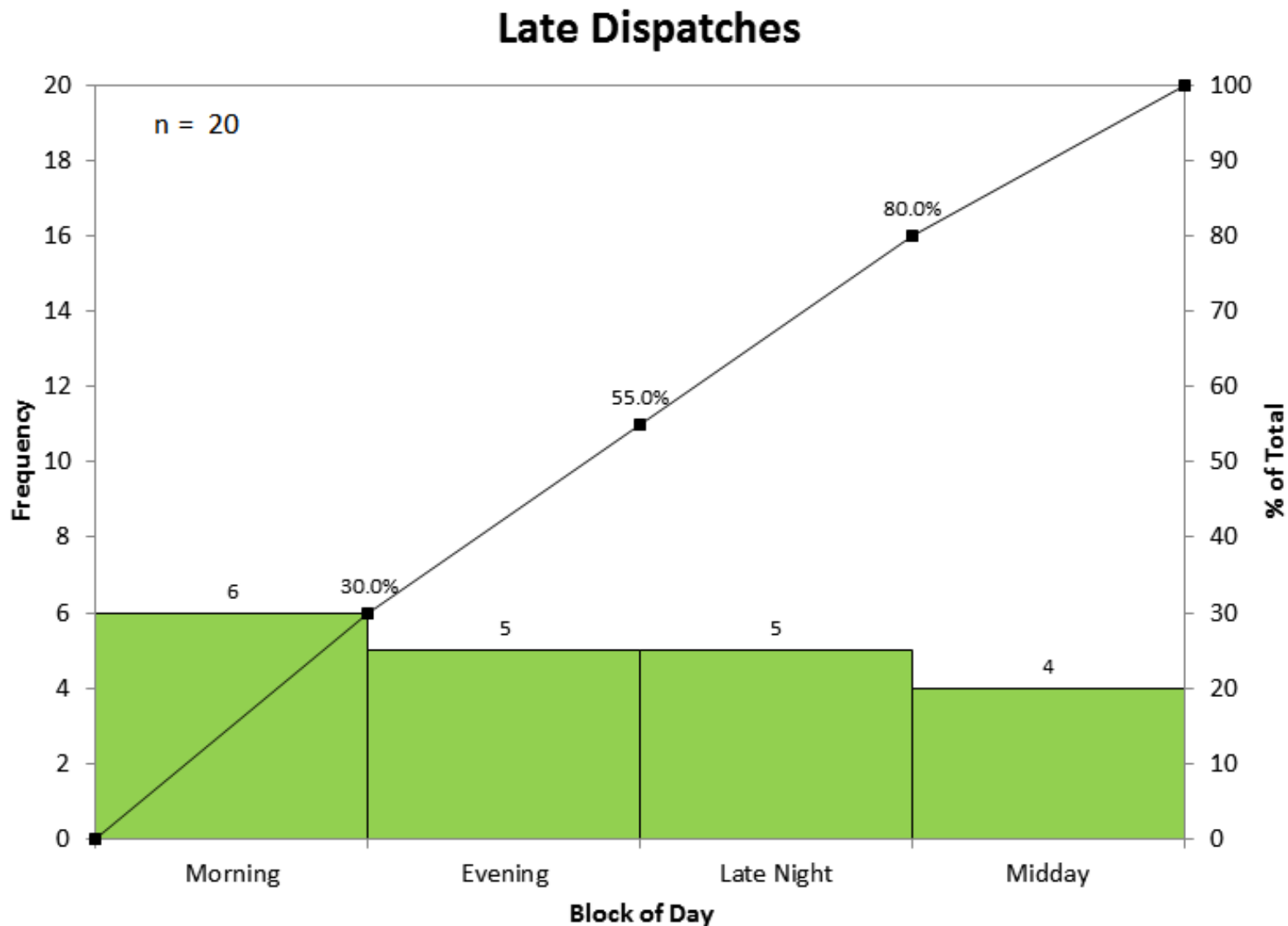# Appendix-Histogram (911 Dispatch Calls)

1. Select data   (for example, number of seconds to dispatch a 911 emergency call, with a goal of 42 seconds)
2. Sort data low to high: 21, 25, 28, 30, 31, 32, 35, 37, 38, 38, 39, 39, 40, 40, 40, 40, 41, 42, 43, 43, 44, 45, 51, 52, 55
3. n= 25
4. Range= (maximum data point)-(minimum data point)=34
5. Class= K=square root of n= 5.0 *(round up for # of bars= 5 bars)*
6. Width=W= Range / K=34/5= *6.8 (round up for bar width=7)*
7. Starting point= (minimum data point) – ½ = 21-½=20.5.
8. Mean= (Sum all data points) / n =969/25=38.76

Emergency 911 Calls

n = 25
mean = 38.76

USL - 42 seconds

Specification

# of Calls

# of Seconds to Dispatch

48

AMI-DADE
COUNTY

Late Dispatches

Late Dispatches

Late Dispatches

Late Dispatches

Late Dispatches